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THE PLANT DISEASE REPORTER

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THE OFFICE OF MYCOLOGY AND DISEASE SURVEY

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CEDAR RUST PROBABLE CAUSE OF APPLE FRUIT BLEMISH

H. E. Thomas and W. D. Mills of the New York State College of Agriculture at Ithaca have submitted the following interesting note under date of August 18.

A peculiar pitting and malformation of McIntosh and other apple fruits has appeared in the Hudson Valley this season.

The trouble was first noted in Columbia County within three or four weeks from the time of blossoming. On McIntosh fruits particularly, spots were killed and as the fruit developed pits were formed resembling somewhat, on the surface, the common bitter pit of apples. Unlike the bitter pit, however, frequently the surface layers of the fruit in the pit as well as the tissues beneath were killed and occasionally cracked as the fruit enlarged. The pits were deeper and less regular in shape than those of bitter pit. A secondary breakdown in the interior of the fruit sometimes followed.

Entomologists seem convinced that the injury is not caused by insects. Growers and specialists agree that mechanical injury is not responsible. There is on the other hand considerable evidence to indicate a relation with the cedar rust fungus:

1. The disease is abundant in orchards which are near cedar trees and absent or rare in orchards more remote from cedars.

2. The disease appears in a year in which cedar rust is severe on the known susceptible varieties.

3. It is an established fact that on the leaves of the so-called resistant varieties of apples, the rust fungus frequently enters and kills a small spot instead of producing the more familiar orange colored spot. Such dead spots have been found this season on McIntosh leaves in the Hudson Valley.

4. Fruits have been found with intermediate symptoms grading from those found on McIntosh fruits to the typical cedar rust symptoms which appear on such varieties as the Wealthy.

For example the more or less necrotic pits may be found surrounded in the living tissue by color markings typical of cedar rust and occasionally by pycnia of the cedar rust fungus.

The loss in McIntosh fruits will be at least ten per cent in extreme

cases and has been estimated in a few instances to be as high as fifty per cent.

This condition promises to develop a new indictment against the red cedar.

BLIGHT DESTRUCTIVE IN UTAH PEAR-GROWING SECTIONS

"Fire blight is occurring very destructively in the pear orchards in Utah County, the center of pear production in this state. Many growers report it to be more severe this year than for several seasons past, but this appears to vary widely with the individual orchard. Some orchards are almost free, while in others practically 100 per cent of the trees are affected. In several young bearing orchards examined there were trees in which half of the wood was affected. Careless and tardy pruning in some of these has led to unnecessary spread of the infection into large limbs and trunks. Where pears are found in other counties they commonly are partially blighted." (Linford, Aug. 8.)

LITTLE DAMAGE FROM DISEASE TO FLORIDA CITRUS CROPS THIS YEAR

J. R. Winston, of the Office of Fruit Diseases, makes the following statement (July 23):

"In general it may be said that Florida citrus groves are more healthy than at any time during my sojourn in the state. It is safe to say that the crop will be the brightest and cleanest that has been produced in many years. The quality and texture can hardly be beat and with a comparatively light crop we may expect rather large sizes by fall. A few more years like this and there will be little need for plant pathologists."

GRAPE DISEASES

Downy mildew (Plasmopara viticola). "Threatens to become more injurious than usual in Connecticut. Has caused the death of young green grapes at ends of the bunches, showing on them in its conidial fruiting stage, and now is beginning to develop the brown rot of the more mature berries." (Clinton, Aug. 1). "Unusually prevalent for this time of year in Rhode Island and parts of Massachusetts. Not only are leaves infected but clusters of young grapes are attacked. The early occurrence and the damage to young fruit are noteworthy features." (Haskell, Aug. 12). "In Delaware leaves, fruit, pedicels, and stem of clusters showing heavy infection, July 14. Very uncommon at this period of year usually, but temperature and moisture have been favorable. Initial infection of as much as 1 per cent found." (Adams, July 15). "Much more than usual in Arkansas. Foliage generally attacked. Fruit seriously affected in a few cases. Not serious in commercial

districts." (V. H. Young, Aug. 15). "Quite bad in several of the vineyards in southwestern Ohio." (E. W. Mendenhall, Aug. 4).

Anthracnose (Sphaceloma ampelinum). "Very destructive in central and southwestern Arkansas. Present on a very large number of varieties but destructive especially on Ellen Scott and a few others. A number of the Munson hybrids appear to be susceptible. Not serious in commercial sections as yet." (V. H. Young, Aug. 15).

Black rot (Guignardia bidwellii). "Found generally throughout South Carolina. From 1 to 5 per cent losses in commercial vineyards. Home vineyards from 10 to 50 per cent loss." (Moore, Aug. 15).

RASPBERRY ANTHRACNOSE (PLECTODISCELLA VENETA)

Ohio: Secondary infections of anthracnose on black raspberries have been uncommonly severe this summer in Ohio, occurring largely in the first two weeks of July. (L. M. Cooley, Aug.1)

Missouri: Commercial raspberry plantings in Jackson County were again badly infected with the anthracnose fungus. An effort made by the County Agent to induce the growers to adopt stringent control measures is having considerable success. The spread of this disease in this section threatens to curtail the yields of these valuable plantings. (I. T. Scott, Aug. 1).

A BACTERIAL LEAFSPOT OF STRAWBERRY

"What appears to be an undescribed bacterial leafspot has been observed in several localities in Utah this year. It is characterized by small, angular, dark green, water-soaked lesions, first visible from the lower side of the leaf or by transmitted light, but later marked on the upper side of the leaf by a reddish or brownish color. These spots enlarge somewhat but remain angular, delimited by the veins of the leaf. Sometimes they may become elongate, following along the larger veins. The lower surface of these lesions bears a copious, milky bacterial slime when wet with dew; when dry, a thin scale of exudate may generally be observed.

"A survey of strawberry fields has not been attempted, but this disease has been found in five of the six fields examined, in four counties. In three of these five infested fields the disease has been sufficiently prevalent to reduce the leaf surface markedly in parts of the fields. Present evidence does not place this as a very destructive disease, but it is the most important foliage disease of the strawberry yet observed in this state." (M. B. Linford, July 26).

FURTHER OBSERVATIONS ON UNKNOWN POTATO DISEASE IN UTAH

By M. B. Linford (August 23).

The unknown potato disease described by Richards, Blood and Linford in the last number of the Plant Disease Reporter as possibly related to the "witches broom" of Hungerford and Dana and as a new factor damaging the potato crop in Utah this year continues to assume greater importance as the season advances. Enough localities have now been found infested to indicate that the range of this disease is general throughout Utah, and while the thoroughness of infestation in different localities is not uniform, still severe losses are occurring in fields or garden patches in all parts of the state.

The losses that are apparent up to the present include reduction in numbers of tubers of marketable size (even though there is sometimes an increase in the numbers of very small tubers), and reduction in quality of the larger tubers through second growth or vegetative sprouting. Plants affected extremely early in their development sometimes fail entirely to set tubers. Sometimes, however, stolon development is profuse and great numbers of small tubers are formed. This appears to be more common with the late varieties than the early, and to result especially from infection shortly before normal tuber formation would have begun. The chief effects of infection after tubers are partly developed appears to be in the nature of a disturbed rest period. Half or fully grown tubers may sprout in the ground in a wide variety of ways. Some develop second growth, others give rise to stolons which in turn set imperfect tubers, while others produce vegetative shoots directly.

While the correlation between earliness of planting and severity of injury continues to hold, generally, late-planted potatoes are failing almost totally in some localities, and it is now apparent that the late varieties as a group are not resistant to this disease. In some instances, late varieties, notably the Russet Burbank, appear to be damaged more severely than early varieties growing side by side and planted at the same time. This has been observed only in late-planted fields. In some localities there appears to have been at least two periods of abundant infection, one early and the other rather late. When potatoes were planted so late as to escape the early period, such early varieties as Irish Cobbler and Early Ohio appear to have been nearly mature at the time of the second infection period, and thus to have escaped serious injury. Late varieties, having a long growing period, were caught in the midst of tuber formation and this affected much more severely. It seems clear, however, that in the varieties which show least conspicuous leaf symptoms, late season infection after shoot growth is about complete may result in modification of the tubers without producing evident foliage symptoms.

It was implied in the earlier report that this disease was new to Utah this year. It has since been learned that apparently this same disease caused the complete failure of potatoes at Green River, Utah, last year and the year before, and occurred sparingly the year before that. This is reported by County Agricultural Agent O. R. Madsen, and is supported also by the observations of numerous growers in that locality. Mr. Madsen saw none of it, however, until this year, in other parts of his two counties.

The relation of this disease to a species of psyllid, mentioned in the earlier account, is confirmed by additional observations. Almost invariably plants showing early stages of the disease bear nymphs of this insect or their casts. This has been found true as far north as Pocatello, Idaho, and in all parts of Utah yet visited; north to Lewiston, east to Vernal, and south to Kanab.

TOMATO DISEASES

Missouri: Fusarium wilt has shown no tendency to spread throughout the extensive plantings in the south Missouri tomato canning district. However, local plantings such as small vegetable gardens have shown an increase this season. This is due to the purchase of wilt-infected seedlings from certain glasshouse growers who have allowed their seed-beds to become infected. Some of them hope to check the wilt by growing only the wilt-resistant varieties next season. Marvana has shown up to great advantage in wilt-infected gardens this season. Most of the tomato growers in the canning districts produce their own seedlings and do not depend upon those grown by glasshouse dealers.

Septoria leafspot is causing the greatest damage ever known in Missouri. Many plantings in the various canning districts show very heavy infection on every plant and yields are being cut from 25 to 75 per cent. Some efforts have been made to control the disease by spraying but the results have not been gratifying, probably due, in part, to the abnormally heavy rainfall we have received in this section of the country throughout the spring and summer.

Bacterial spot (Bacterium vesicatorium) previously reported from one locality in this state, has been found quite serious in a planting in Buchanan County. This planting is far removed from the locality where it has been observed. (I. T. Scott, Aug. 1).

Utah: Yellow blight is much less prevalent this year than last. It has been observed from Millard County on the south to Boxelder County on the north and Uinta County on the east, occurring in about 75 per cent of the fields thus far surveyed. Infestations are generally very light, from a trace up to six per cent of the plants. Later season observations are likely to find heavier infestations. (Aug. 8). Higher percentages of infestation are being observed as the season advances. The most severe losses yet observed were in small commercial patches at Green River where losses of 60 and 70 per cent of the plants were observed. The majority of plantings, however, still show only from a trace up to 10 per cent of the disease. (Aug. 23).

Bacterial canker (Aplanobacter michiganese) has been found to be very generally distributed and highly destructive in an examination of 21 fields during the last 10 days. Fourteen of these fields contained the disease, and the average

infestation in the 21 was 20 per cent of the plants. These fields were chiefly in Utah County. The plants were grown either locally or at Moapa, Nevada, almost entirely from Utah-grown seed. One field in Utah County has only 5 per cent of healthy plants remaining; the others have mostly died from this disease. (Aug. 8).

Mosaic is distributed throughout the tomato sections of Utah thus far examined, occurring in highly variable amounts. Many fields are free from it or nearly so. The highest infestation yet counted is 45 per cent in one large field. In one 30 acre field, 22 per cent of the plants were infected, many of them showing symptoms on only the uppermost leaves, indicating late season transmission. (Linford, Aug. 8).

LATE SPREAD OF SUGAR BEET CURLY TOP IN UTAH

"There appears to be a late season spread of this disease, at least in some parts of the state. Up to August 1, fields in Cache County rarely showed more than 5 per cent plants affected, and in other parts of the state beets generally have looked well. Fields examined in Utah County during August 3 to 6 have shown much more of the disease. Commonly between 15 and 50 per cent of plants have been found affected. The heaviest infestation observed is 95 per cent, and the second heaviest 78 per cent. Most of these plants have been healthy until within ten days or two weeks." (Linford, Aug. 8).

COTTON WILT

South Carolina: General throughout eastern portion of state. Damage as much as 25 per cent found on individual farms. In all cases losses are due to failure to plant wilt-resistant seed. (Moore, Aug. 15).

Arkansas: Considerable amounts appearing on susceptible varieties such as Delfos and some strains of Trice. Probably less than last year. (V. H. Young, Aug. 15).

CABBAGE YELLOWS

New Jersey: Observed in South Jersey following a period of high temperature. (W. H. Martin, Aug. 1).

West Virginia: There has been a very large amount of injury from cabbage yellows. (N. J. Giddings, Aug. 3.)

Iowa: Experimental plots in Muscatine County, the center of cabbage district, show the following results by Aug. 1:
Copenhagen Market and Golden Acre 70 per cent infection; Marion Market and Iacope 10 per cent infection. The strains of Iacope vary somewhat in the percentage of marketable heads. (Archer, Aug. 24).

REPORTS ON DISEASES OF CUCURBITS

Bacterial wilt (Bacillus tracheiphilus). "There are more reports of this trouble in Connecticut than in the average season, especially on cucumbers and summer squash." (Clinton, Aug. 1). "Generally distributed in southern New Jersey. Appeared the latter part of July, following a period of high temperature." (Dept. Plant Path., Aug. 1). "Losses of 1 to 2 per cent on cucumber have occurred in some localities in Iowa. In Muscatine County there is 10 per cent infection of cantaloupe. The unusual prevalence of both the striped and the 12-spotted cucumber beetle has not yet been successfully checked by the use of calcium arsenate and gypsum." (Archer, Aug. 24).

Powdery mildew (Erysiphe sp.) "This disease has recently made its appearance in squash at Moab in Grand County, Utah, but it is not doing serious damage. This is not a cantaloupe district. At Green River where powdery mildew was destructive to the cantaloupe crop for two years past it has not yet been observed." (Linford, Aug. 23).

Anthracnose (Colletotrichum lagenarium). "General on watermelons throughout South Carolina. Losses range from 10 per cent to 100 per cent. Average for state more than 25 per cent." (Moore, Aug. 15). "Anthracnose on cantaloupe is just making its appearance for this season." (Archer, Aug. 24).

Leafblight (Macrosporium cucumerinum). "At Green River, Utah, where the cantaloupe constitutes a very important crop, this disease occurs generally and is causing serious losses in some fields. In one 5 acre field there is over 20 per cent defoliation and almost 100 per cent leaf infection. Here the yield is estimated by the grower to be 30 per cent in numbers of fruits. The melons are small and of poor shape, and complaints from the markets indicate that they are of inferior quality. In most infested fields only a trace of the disease is present. Cantaloupe, honey-dew melon, and cucumber appear to be affected almost equally, and watermelon and squash somewhat less. The worst infestation observed was in a field where cantaloupes were grown last year and the year before. This disease has not been recognized at Green River before." (Linford, Aug. 23).

DECAY OF MUSKMELON

"In the cantaloupe section of Anne Arundel County, near Baltimore, Maryland, many growers are experiencing losses from a fruit rot. One grower estimates a 60 per cent loss of his late

crop and a 5 per cent loss of his early crop. Since his various fields total between 30 and 40 acres about equally divided between early and late melons, the loss will be heavy.

"The melons are attacked as they are approaching maturity. In the early stages of the disease a darkening of small areas of the rind is visible through the netting. The spots gradually increase in size and depth of penetration, become slightly sunken, and sometimes crack open. The diseased areas soon become covered with salmon-colored masses of Fusarium spores. The lesions are usually on the upper surface of the melon.

"The cause of this decay is uncertain. The above-mentioned Fusarium is found rather constantly associated with the lesions but it has not been proved to be the cause." (Gilbert and Haskell, Aug. 26).

STEM RUST OF WHEAT

South Dakota, Minnesota, North Dakota: Grain in most of South Dakota is harvested or safe. In the northeastern corner of the State probable rust damage varies from 5 to 25 per cent with the most severe damage near the Minnesota line.

In the southern Red River Valley from Morris and Breckenridge, Minnesota to Fargo, North Dakota probable rust damage diminishes from south to north ranging from 50 to 15 per cent.

In the northern Red River Valley of North Dakota and Minnesota wheat is mostly ripe or cut. Rust was abundant but damage has proved slight expcet in late fields.

Rust is abundant in central North Dakota. In most of this section early bread wheat is little damaged, and injury to late fields will depend on weather. Durums show damage as great or greater than late bread wheats.

In southeastern North Dakota, from Jamestown east to the Red River Valley rust losses may range up to 15 per cent.

In southwestern North Dakota the crop is cut with little rust damage. In northwestern North Dakota early fields are ripening with little injury. Late fields in this area are uncertain.

Along the Canadian border harvest is about 10 days away and losses will depend on weather. (E. C. Stakman, Aug. 12.)

Summarizing the situation for Minnesota, I believe that the epidemic this year was probably the worst since 1916, although I can not be sure. It is possible that that of 1923 was more destructive, because in that year there were heavy losses in the Red River Valley, while this year much of the Red River Valley escaped serious damage. (E. C. Stakman, Aug. 12).

South Dakota: Has done only small amount of damage on common wheat but has ruined the durum wheats. Many fields of the latter are not being cut. The rust is rather spotted in some places being 100 per cent in others much lower. Will probably cause no less than 20 per cent damage on all wheat this year. Oats, rye and barley are also badly damaged. (Evans, Aug. 1).

Kansas: Stem rust appeared just before harvest in very small amounts in most parts of Kansas. The heaviest infections, occurred in the south-central part of the state where 25 per cent rust could be found on 50 per cent of the stems in some fields. Maximum infections observed under field conditions varied from 5 per cent in northern Kansas to 40 per cent in southern part of the state. Little if any loss occurred. (C. O. Johnston, Aug. 15).

Montana: Apparently there will be relatively little loss in Montana. The wheat is good, much of it is safe, and rust has scarcely been a factor. (E. C. Stakman, Aug. 12).

Utah: This rust has shown increased prevalence as the season has advanced, causing considerable damage to some fields of late irrigated wheat. Heavy infection has frequently been seen to cause no important injury due to the lateness of the attack, but in a few small fields near Price losses estimated at 20 per cent of the crop were seen. Here very severe infection beginning relatively early had led to marked shrinkage of the kernels. (Linford, Aug. 23).

OAT STEM RUST

Minnesota: Oats through most of Minnesota are very severely injured by crown rust and stem rust. The straw was so weakened that the hot weather about July 20-25 caused it to crinkle, and many fields are a tangled mass. In many fields crown rust did the greater amount of damage. In fact I am inclined to think that it did far greater aggregate damage than stem rust, although things happened so fast about harvest time that it was impossible to follow developments as closely as might have been desired. (E. C. Stakman, Aug. 12).

North Dakota: In many sections of North Dakota the oat crop is practically ruined. This seems to be true of the southeastern quarter of the state. We haven't received new reports from other sections. As is true of Minnesota and South Dakota, I think that crown rust probably did as much or more damage than stem rust. (E. C. Stakman, Aug. 12).

South Dakota: In eastern and northeastern South Dakota the oat crop is very severely injured by a combination of crown rust and stem rust. It is the worst condition I have ever seen in oats. I do not know yet just how badly the oats farther west are injured. (E. C. Stakman, Aug. 12).

Kansas: Stem rust appeared on oats in Kansas just before harvest and did practically no damage. Infections as high as 50 per cent were observed in southern Kansas while a trace to 20 per cent was found in the northern part of the state. (C. O. Johnston, Aug. 15).

LEAF RUSTS ON CEREALS IN KANSAS

C. O. Johnston, of the Office of Cereal Crops and Diseases, stationed at Manhattan, has sent in the following report, dated August 15:

"An extremely heavy infection of leaf rust of wheat occurred in most parts of Kansas this year. Only a small section in the western part of the state, where the crop was injured by dry weather, escaped. Many fields showed 70 to 100 per cent infection on all leaves. Reductions in yield of 2 to 20 per cent undoubtedly resulted.

"An extremely heavy epidemic of crown rust occurred in most of the oat growing sections of Kansas. 80 to 100 per cent infection occurred at Manhattan and the crop was badly injured, some fields apparently declining at least 25 per cent in yield.

"Considerable leaf rust occurred on rye in Kansas in 1927. Infections of 5 to 25 per cent were observed in fields in various parts of the state.

"Leaf rust of barley was much more prevalent in Kansas in 1927 than usual. Infections of 20 to 60 per cent were noted in several fields of Stavropol and Tennessee winter. A trace to 5 per cent was found in practically every field observed. "

WHEAT SCAB SEVERE IN MISSOURI

"Due to the serious infection of wheat with scab this season much concern is being shown by growers in obtaining clean seed for fall sowing. The weight of much grain is lowered this season because of the presence of many scabby grains. Germinator tests show low germination with the development of much mold on the seedlings which has been found to be Gibberella in practically all cases. It is feared that the use of this year's grain for seed will result in large losses from seedling blight and in poor stands, particularly if the coming season is favorable for this disease. Fanning and seed treatment is being recommended, especially where germinator tests show much scab." (I. T. Scott).

BUNT ON RYE AND WHEAT IN KANSAS

Infection of rye and wheat-rye hybrids by bunt has been reported from Washington. The following report of its finding in Kansas on rye is by C. O. Johnston, August 15:

"Several thousand heads of rye grown from seed heavily inoculated with bunt (*Tilletia laevis*) were examined and three

heads were found which were bunted. The rye was a mixture in badly smutted wheat seed and wheat plants grown from the seed were heavily smutted."

"Not so severe on wheat for the state as a whole as in 1926. Bunt has appeared in rather large amounts in eastern Kansas this year for the first time. Soft wheats such as Fulcaster, Harvest Queen and Currell are grown in this section of the state. The copper carbonate treatment campaign has been very successful and effective in central and western Kansas."

REPORTS OF FLAX RUST

North Dakota: Very common in the eastern half of the state. Severe damage reported from a few growers, with losses estimated at 30 per cent of the crop. (W. E. Brentzel, Aug. 1).

South Dakota: Abundant in all flax fields. Attacking both stem and leaves and doing some damage without doubt. (Evans, Aug. 1).

ALFALFA LEAFSPOT TROUBLESOME IN MISSOURI

"Pseudopeziza leaf-spot is more widely spread this season than heretofore. There is always some infection but it is generally not severe enough to seriously affect the quality of the hay. In some fields this season, however, the leaves are so badly spotted that there is considerable loss due to the poor quality of the hay produced." (I. T. Scott, Aug. 1).

CORN ROOT ROT IN KANSAS

"Numerous specimens are being sent in of corn plants affected by root and stalk rots. In practically every case, however, these rots seem to be secondary to injury of the roots and stalk bases by either the southern or western corn root worm. The plants lodge badly and the stalks show badly discolored nodal plates when split length-wise. Roots are rotted off and plants often fired or chlorotic." (Johnston, Aug. 15).

HORSECHESTNUT LEAF BLOTCH (GUIGNARDIA AESCULI) IN IOWA

"In nursery rows there is a 100 per cent infection. On seedlings and young second growth in woods the infection is extremely heavy." (Archer, Aug. 24).

A SCLEROTIUM ROT OF BULBS IN MISSOURI

"Serious dry rot caused by a species of Sclerotium has developed in stock bulbs of grape hyacinth and narcissus in a bulb-producing section of Missouri. The original source of the infection is not yet fully known. The State Plant Board is condemning the diseased bulbs, and an effort is being made to check the trouble before it gets widespread." (I. T. Scott, Aug. 1).